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ABSTRACT

The nature of student participation with WebBoard, an electronic bulletin board system that can be used for synchronous and asynchronous discussions among participants, was studied in an action research project in two settings. In one, 67 and 59 high school students of Japanese participated in a course using WebBoard. The number of times students used WebBoard, the number of postings they made, and the type of postings they wrote were studied under incentive or no incentive conditions. Incentives were such things as a class "food day." In the other setting, WebBoard use was studied with 12 students in an integrated Bachelor's/Master's teacher education program, 14 inservice teachers in a graduate course, and 6 inservice and preservice teachers in a course. For students at all ages, some requirements were necessary in order for them to remain active participants on the WebBoard. Occasional rewards for the high school students boosted the volume of messages and also created a temporary slump after the reward was achieved. After the slump, a higher than normal rebound occurred, and use was higher than normal for several weeks. Graduate students were more motivated to post, but establishing grading criteria for the quality of the posts was effective in keeping up WebBoard use. The advantages and disadvantages of the WebBoard approach are discussed. The most apparent advantage was the opportunity for the incubation of ideas. (Contains 18 references.) (SLD)

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Instructional WebBoard Strategies in Secondary Education and University Teaching

Universities, and more recently high schools, (PRNewswire, 2001), are racing to attract students through distance learning options. Distance learning is not a new concept. Mail correspondence courses have a long and rich history. Telephone-based and two-way video courses have also been utilized, although until recently, the latter produced "jerky" images. One-way systems such as satellite, cable, microwave, and ITFS (Instructional Television Fixed Services) and two-systems such as fiber optics and compressed video now provide higher quality options (Barker & Dickson, 1996). The advent of the Internet and the World Wide Web has also created a proliferation of new technology options for proving distance-learning opportunities (Poole, 2000).

By the end of this year, approximately 5.8 million students will have taken online courses from 75% of the universities in the United States. Universities offer the web-based courses for a number of reasons. Primarly among them is reaching a new market. They see an audience that is not accessible with traditional on-campus courses. Universities fear being left behind. "If we don't offer the courses online, someone else will." A second reason is to retain their present students. Universities fear today's students will opt for virtual classrooms in the future. Even high schools enter the market to reach students who might not otherwise attend traditional brick and mortar institutions.

Students participate for a variety of reasons. Time and location are the two most common reasons. "One of the reasons online courses have become popular is that students can participate when it is convenient for them to do so" (Poole, 2000, p. 164). Online courses may give student more control over the learning process. Since web-based courses are often taught asynchronously, students can attend at their convenience. Because the web is widely available, the courses can be completed from various locations. Online university students also avoid the frustrations of commuter traffic and campus parking.

Web-based courses have evolved from inaugural sites where text was posted with limited interaction between the professor and student, and even less interaction among students, to discussion-based courses involving communities of learners. Educators are increasingly seeking ways to promote student interaction with each other and themselves. While course developers initially believed that discussion-based courses were poor candidates for web-based courses, these courses proved to be some of the more successful ones (S. Knox, personal communication, 1997). As VanGorp (1998) noted, "The Web is now more than an area to access and post information: It is a place to interactively communicate and construct knowledge" (p. 12). Computer conferencing is one way to promote learner autonomy and it affords equal opportunity for students to participate in discussions (Cifuentes, Murphy, Segur, & Kodali , 1997). Three common Internet communication technologies are email, interactive chat, and bulletin board discussions. Electronic bulletin boards are a popular technology because they accommodate threaded discussions, where participants respond to each other's comments and those comments, known as postings, are chronologically and topically connected. One such commercially available electronic bulletin board is O'Reilly's WebBoard. The WebBoard can be a closed or open bulletin board system that can be used to hold synchronous and asynchronous discussions among participants.

The purpose of this study was to explore the nature of student participation with WebBoard in a high school Japanese language program and three university graduate educational research courses. The study was an action research project and we report descriptive results.

Background of the Study

Florida Gulf Coast University (2001) suggested that nine different forms of online instruction exist. These include: sharing information on a web site, providing practice for new concepts by using online activities such as simulations and games, communicating one-to-one or one-to-many via email for instructional purposes, conducting discussions using a threaded discussion board, holding office hours using chat room software, delivering library resources via the Internet, giving practice tests or evaluating performance using online assessments, and submitting assignments electronically. One of these, the threaded discussion board allows students to communicate much like a conventional bulletin board, but in a more versatile fashion (Mitchell, 1996). On the computer bulletin board, students can post questions, answers, comments, class notes, photographs, video, and music; they can submit links of interest; and they can form study groups. Most bulletin boards allow threaded discussions. An additional benefit of a web-based board is the ability to access it wherever and whenever a computer connected to the Internet is available.

Instructors create discussion areas, known as conferences, where students usually interact in asynchronous time. The conference areas can be private or public. The instructor determines which students have access to private conference areas while all students have access to the public conference areas. The students and instructor post and react to messages, similar to email messages, in these conference areas. Threaded discussions allow students to follow and respond to various topics posted in the conference areas. A number of different boards can be created, each having its own set of conferences, messages, and users, as well as its own managers and conference moderators. Research indicated that electronic bulletin boards have been widely used to guide and mentor middle and secondary students during research projects (Murfin & Go, 1998) and for interactive virtual discussion in teacher education (Formosa, 1998; Hyun, Smrekar, DiPento, & Matthews, 1999; Justice & Espinoza, 1999).

The interactions among students and between students and the course instructor promote a constructivist approach to learning by encouraging complex interactions between learners and content. Constructivism involves learning in context; learners construct much of what they learn and understand as a function of their experiences (Schunk, 2000). At educational institutions, educators are discovering diverse uses for programs such as WebBoard. These include virtual office hours, student-to-student discussions, curriculum development, and distance learning. Through asynchronous web conferences and synchronous chat, instructors promote community building and project collaboration. A major concern of online educators is student isolation. As Cambre, Erdman, and Hall warned in 1996:

> In a regular, on-campus course, students acquire ideas from each other and from the instructor, refine their work as they go along, and produce projects that reflect a collaborative and interactive effort. If students are expected to produce the same level of work through distance learning, their isolation must be addressed. (p. 227)

Online conferencing through bulletin boards is one way to address student isolation (Florida, 2001) while promoting constructivist learning. Cifuentes et al. (1997) reported that "for computer conferencing to be a learning experience, students need (a) to embrace both the process and the content of computer conferencing and (b) to recognize the value of the experience to themselves..." (p. 188). The interaction present in computer conferencing appears to be a positive step toward diminishing student isolation and creating communities of learners.

Methods and Results

Data were collected in two settings: a high school Japanese language program and three university graduate educational research courses. The WebBoard was an auxiliary component of the Japanese language program. The instructor encouraged students to participate in online discussions. Two of the three university research courses were fully web-based, online courses that required online discussions. While we will be sharing WebBoard usage for these groups, we do not believe the groups are equivalent. We are merely sharing our experiences in a variety of situations.

High School Japanese Program

We began our investigation with a high school Japanese language program from fall semester 1998 through fall semester 1999. We conducted this three-semester phase with two groups of students. The first group consisted of 67 high school Japanese language students including ninth graders (n=16), tenth graders (n=22), eleventh graders (n=15), and twelfth graders (n=14) with Japanese skill levels of first year students (n=32), second year students (n=23), third year students (n=10), and fourth year students (n=2). Approximately 65% of the students had Internet access at home and all of them had Internet access at school.

The second group consisted of students registered in the high school's Japanese program during the third semester of the study. It consisted of 59 high school Japanese language students including ninth graders (n=20), tenth graders (n=19), eleventh graders (n=18), and twelfth graders (n=12) with Japanese skill levels of first year students (n=29), second year students (n=20), third year students (n=3), and fourth year students (n=7). Approximately 76% of the students had Internet access at home and all of them had Internet access at school.

We recorded the number of times the students accessed the WebBoard, the number of posts they made, and the type of postings they wrote. The categories for this measure consisted of social postings, questions about Japanese, answers about Japanese, and homework collaboration. *Questions about Japanese* refers to posts that asked questions about assignments, due dates, and the content of the Japanese class or the Japanese language in general. *Japanese answers* consisted of posts that attempted to answer the questions in the question category. *Homework collaboration* included the sharing of assignments in Japanese or other classes, questions and answers about other classes, and setting up study groups. *Social* posts included everything not included in the other categories. The tallies from these posting categories showed the use of the board in terms of relevance to the Japanese course.

During the first two semesters (fall 1998 and spring 1999) of the study, students were assigned to post at least one message a week. This assignment equaled 5% of a student's grade. Students were encouraged to use the board to collaborate outside of class on their homework, ask questions, or just leave notes. Students were given examples of how they might use the board, such as: meeting in the chat room for study groups, sharing homework answers, asking each other questions about problem material, and checking with others on due dates and assignment directions. Also, in order to see how students would use the board if given a choice, students were assured that purely social messages like jokes and notes were just as valid for points as non-Japanese related messages. After a pattern started to appear, incentives such as a class "food day" for a 100% student posting percentage week was tested. Finally, no class time was reserved to work on these assignments.

The third semester of this study began in September 1999. Due to network setup schedules it was unknown whether or not all students had Internet access at the beginning of the school year. Consequently, the permissions to use the school Internet were not yet

entered into the network, so students without home access were unable to complete their postings. Because of this, making the bulletin board an assignment would make unjust demands on those students without Internet access. In addition, there was some question as to how students would respond to the bulletin board if it were not an assignment. Therefore, students were given new instructions concerning the board:

- The weekly WebBoard assignment was not for a grade.
- It was available to all Japanese students.
- New students were instructed and advised how to use WebBoard like the students in fall semester 1998.
- In a conference called, "The Extra Mile," students could complete practice sentences similar to those on weekly tests for extra credit.
- Examples of things done in class were posted on the board completed so students could analyze them.

In October of the fall semester 1999, school access to Internet was available to all the students and the assignment to post on the WebBoard once a week was reinstated. This time however, the assignment was less open ended.

- Part of the post this time had to be a Japanese sentence that involved the week's vocabulary and grammar.
- No sentence could be used twice.
- This sentence was worth 10% of the week's grade (so an A for the week was impossible without completing the assignment).
- Time would be available once a week in class to make posts after the other computer assignment was completed.
- The sentence translation in "The Extra Mile" was still extra credit towards the weekly test scores.

Social postings and homework collaboration were the two most common types of messages posted in the high school Japanese language classes. The social category included humorous things found on the Internet, writing samples, debates over ethics and social issues, jokes, riddles, and party announcements in that order. Sixty percent of the students posted messages each week when no incentives other than the grade attached to assigning the students to use the WebBoard were implemented. When the WebBoard was not required for the class, the activity on the board in terms of percentage of students posting plummeted. Students with Internet access at home were more likely to post messages than students who did not have home Internet access (see Figure 1).

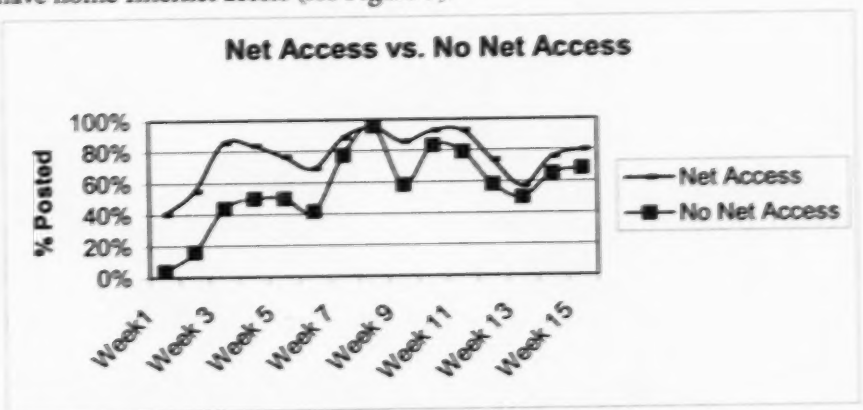

Figure 1. Student Posts Depicted by Home Internet Access, Fall 1998

Upper level high school students were also more likely to post messages (see Figure 2). Upper level classes, for example, when offered a reward of food day for 100% of the students posting in a single week, reached that level of posting in less than 3 weeks. The lower level students, on the other hand, took nearly 6 weeks and extra encouragement to reach their goal. After the food day, the upper level class took 4 weeks to return to baseline, while the lower level took only 2 weeks.

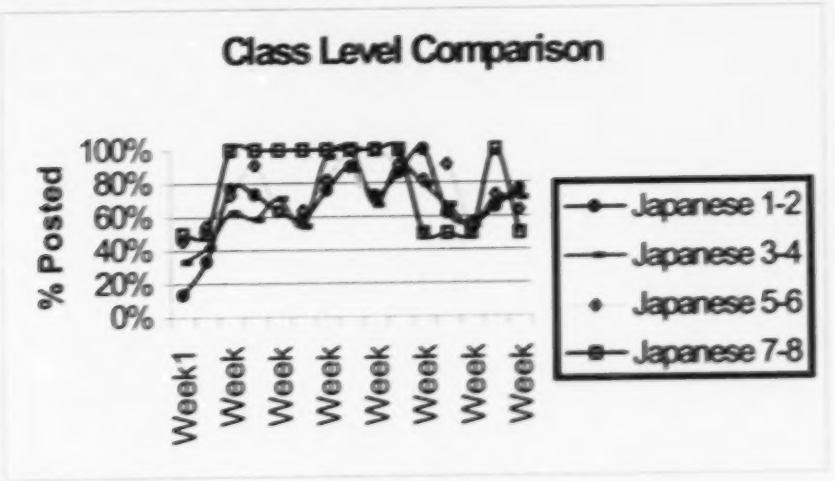

Figure 2. Student Posts Depicted by Class Level, Fall 1998

Often, students would find an item of interest in the messages and make a reply to someone else's message. If they received a positive reply to what they wrote, often their activity increased, and they would start topics as well as reply to them. When the attention the student received subsided, or if the attention turned negative, his or her use of the WebBoard decreased.

Graduate Educational Research Courses

Based on our findings from the high school Japanese study, we investigated WebBoard use under different university class conditions. Our first group was an on-campus class consisting of 12 Integrated Bachelors/Masters (IBM) students during spring semester 2000. These students were completing a five-year teacher education program that culminated in a masters degree in education. All but one of the students was female and all of them were preservice teachers. The students received a WebBoard login name and password and were encouraged to use the WebBoard to discuss topics pertinent to the course but were not required to use it. All of the students were familiar with WebBoard from previous classes. All of the students had Internet access on campus.

A second group of educational research students was enrolled in the same course in fall semester 2000, however, the course was offered fully online through the Internet. Fourteen students were enrolled in the course (n=2 males and n=12 females). With the exception of one student, all of them were inservice teachers. All of the students had Internet access at home and at their schools. The course consisted of eight units. Textbook material in the web-based classes was supplemented with web pages and Powerpoint presentations. The students cooperatively worked on projects and discussed concepts covered in the textbook

and in the instructor's web notes on the WebBoard. The WebBoard was one component of the research course and it counted for 10% of the students' grades. In order to receive full credit, the students posted three messages for each unit. The grading rubric in Table 1 was shared with the students and used to evaluate their posts.

Table 1
Grading Rubric for Evaluating Student Posts

Level 1 — C
Student messages explore the topic or issue by identifying and organizing relevant facts, developing or deriving logical conclusions, and presenting them to fellow students and the instructor.
Level 2 — B
In addition to (1), students provide examples related to the topic and interact in a dialogue that involves challenging or supporting ideas that others have proposed.
Level 3 — A
In addition to (2), students initiate new threads of related discussion in the context of the group and individual understandings that emerge in the dialogue. Students explain how a new or previous concept connects to the current concept.

Each week, the instructor held an electronic office hour via the Internet chat feature of WebBoard. The time and day of the week that these were held varied from week to week. During that time, the instructor synchronously fielded questions from the students. While some students never joined the electronic office hour, others connected each week. At the conclusion of the electronic office hour, the text from the electronic office hour was posted on the WebBoard.

The third group of educational research students was also enrolled in a totally web-based course in spring semester 2001. This group consisted of 6 students (n=3 males and n=3 females). This group was a combination of inservice and preservice teachers. The same rules and procedures for the previous group applied to this third group of research students.

While the instructor made the option of using WebBoard available to the 12 students in the campus-based research class, none of them posted messages to the WebBoard. WebBoard use was not required for the course and the students did not choose to use it. This may have been because they did not feel the instructor felt it was important. It may have also been because they were not as familiar with WebBoard as the instructor presumed. Whatever the reason, the students did not participate.

WebBoard participation was required of the web-based classes, and all of the students posted messages to the WebBoard. Ninety-three percent of the students entered the required three posts for each unit. Assessing the students' posts with the rubric shown in Table 1 was an effective method to increase the quality of the posts to the Webboard in the university classes. Approximately 75% of the posts reached Level 3. The WebBoard messages posted by the graduate students revealed synthesis and evaluative level understanding of the class topics. Prior to implementing the rubric assessments, the responses were often simple sentences such as "I agree." Once the rubric was introduced, a statement such as the following appeared: "The issue that Dori raised about the CMT tests and the correlation that the media finds is an interesting one. Even though I am not familiar with this type of test or the procedure that is followed in the schools when students are asked to take this test, after reading about data-

collector bias as an instrument threat in the book, I really wonder if teachers or the school administrators take into consideration all these threats to internal validity when educational research is conducted. The idea that Ramona suggested for the limitation of the instrument threat is an interesting one and might affect the students' test scores. Giving that option to the students-- to choose in what room they would like to take the test-- might limit the unconscious biases that are mentioned in the book on page 374."

Many of the educational research students were anxious to use the chat feature of the WebBoard. Each week the instructor conducted an electronic office hour. During the electronic office hour, he answered questions that were posed by the students. While some students never joined the electronic office hour, an average of 67% of them connected each week. The students shared responsibility for capturing the text of the electronic office hour and posting it on the WebBoard. The students were much more likely to pose questions to the instructor on-line via chat during the electronic office hour than through a WebBoard conference. The students also used the WebBoard to collect and share data for group projects. This included designing simple research studies, collecting and sharing data as an attachment, analyzing the data, and reporting the results. Private conference areas were used for these group projects.

While one of the dangers of online discussions is the quantity of posts that must be read (Kimball, 1995), too few students involved in the discussion can also be problematic. When we compared similar discussion topics with the group of 14 and the group of 6, we found that the group of 14 produced a proportionally higher number of post than the group of 6. Over the course of four discussion topics, the group of 14 produces four times as many posts as the group of 6. We also experimented by dividing the 14 student class into two groups of 7. The average number of student posts per question was 14.8 when the 14 students were together. When the group was divided into two groups of 7, the average number of posts per question dropped to 4.

There was a moderate, positive correlation between the number of posts students made and their score on the course examination, $r(12) = .58$, $p < .05$. While students may benefit academically from posting messages, it might also be that those who are mastering the material are more confident and therefore more likely to post responses to the discussion. WebBoard did not allow us to monitor which students were reading the postings. Students might find reading the discussion as, or more, beneficial than participating. This is an area that warrants further research.

Discussion

The dynamics of the WebBoard reflect a combination of academic responsibility, social acceptability, and technological comfort that exert influence on the individual students in varying degrees and varying times. Positive experiences increase the number of posts while negative ones decrease them. For students of all levels, some requirements must be made of them to participate on the WebBoard for it to remain active. Occasional rewards to the high school students for high activity boosts the volume of messages, but also creates a temporary slump after the class achieves the reward. Still, after the slump a higher than average rebound occurs and provides higher than normal results for several weeks before the messages return to their baseline.

While graduate students are more motivated to post to the WebBoard without rewards, establishing grading criteria for the quality of the posts is effective. There must be a purpose for students to participate in WebBoard discussions. Initially the instructor must create the purpose. In the case of the on-campus research students this did not occur and the

conference area was not used. Cifuentes et al (1997) emphasized the importance of quality entry by describing grading crieteria. "This emphasis on quality of entry established a meaningful purpose for the groups, leading to the general belief that computer conferencing is a relevant classroom activity" (p. 197). MacKinnon (2000) also recommended establishing evaluation criteria for student posts.

The more open the parameters of the assignment for the high school students, the more likely it is that students will participate. Schlagal, Gtrathen, and Blanton (1996) studied email interactions among preservice and inservice teachers. They found that "too controlled a structure seems to inhibit free exchange. In contrast, too free a structure appears to result in free-flowing, socioemotional rather than professional, task-oriented exchanges" (p. 181). It can be difficult to maintain this balance between the two.

Students must also feel comfortable using the technology. Instructors should provide safe practice opportunities for students who are unfamiliar with the conferencing software (Cambre et al., 1996). The Florida Gulf Coast Univeristy (2001) suggested three principles to consider when encouraging interaction among learners. First, make no assumptions about the students' abilities to use electronic communication technologies. Second, provide time and opportunity for students to practice and master the technologies. Third, create opportunities for students to use the technologies to interact.

The WebBoard may allow high school and graduate students to overcome the reluctance of asking the instructor questions and speaking in front of each other because of possible embarrassment. While this is positive, the anonymity associated with using the Internet can also make users feel isolated. Online discussions help guard against Internet isolation. "A virtual conference, unlike a mailing list, fosters a feeling of belonging to a group" (Kimball, 1995, p. 54). Poole (2000) found "The Web-based delivery medium did not inhibit the development of the class as a community. In many ways, it actually contributed to the formation of a cohesive group" (p. 175).

Online instructors can build a sense of community by asking students to introduce themselves to the group with an initial conference post. This exercise provides students with an opportunity to safely practice their technology skills in a non threatening situation and also encourages community building. Some instructors ask students to share photos of themselves with the class. Buckley (1997) reported an advantage to the physical anonymity provided online. As someone with a physical challenge, she found online discussions physically freeing.

Roles within an electronic discussion should be clearly defined. Poole (2000) recommended that students be responsible for monitoring discussions. She found that students were more involved when the discussion was more student-driven and less instructor-driven. Students need to know what is expected of them and what type of input they can expect to receive from the instructor. In the graduate research courses we studied, the instructor would wait for students to correct each other's misconceptions. When that did not occur after 2 or 3 days, the instructor would enter the discussion and either correct the misconception or pose another question to prompt additional thinking about the topic. Initially the students were uncomfortable with the instructor's absence, and they sought his approval of their postings. After the instructor explained the role he wished to play, the students became more comfortable interacting with each other, rather than solely with him.

We found the students were more comfortable asking the instructor questions during WebBoard's synchronous chat. Perhaps they liked the immediate feedback provided by chat. Chat discussions appear fleeting (one the screen one minute and gone the next), which may make asking questions less intimidating. Conference board postings are permanent in the

sense that they may be perused for weeks. This permanence may also intimidate some students. A combination of asynchronous and synchronous discussion appears to be ideal because each has its strengths.

Cifuentes et al (1997) suggested limiting groups to 15 members to encourage meaningful communication among participants. We concur. We found that members of our group of 14 would at times repeat comments made by peers. We also found that when groups sizes fell to 6 or 7, the number of posts and quality of the interaction deteriorated. We believe discussion groups with around 10 participants might be optimal.

Occasionally students stray from the intended discussion topic. Social discussion were popular with the high school students. The university courses we studied included three non academic conference areas. A student lounge conference was available for students to post messages unrelated to the course. A technology conference area was created for students to post questions related to using the WebBoard software. An electronic office conference area was used to field questions about course requirements and assignments. These additional conference areas help build a sense of community on line. Thomas, Clift, and Sugimoto (1996) classified computer-mediated conversations into five focus areas: article (comments on article read for the class), content (course readings), technical (use of the website), procedural, (announcements and course requirements) or nonacademic (personal messages). Instructors may wish to create special conference areas for each.

In conclusion, the most apparent advantages to electronic discussion groups is the opportunity for incubation of ideas. Students read each other's messages, reflect on them, and post their responses. The pace of reply is controlled by the students which affords them reflective thinking time. The WebBoard has its benefits and shortcomings, but is a valuable tool worth looking at and experimenting with in an effort to make students better written communicators and better collaborators in their study of various content areas.

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